UNIVERSITI TEKNOLOGI MARA

REAL TIME MONITORING AND CONTROLLING USING PETRI NET ALGORITHM FOR BATCH PROCESS PLANT

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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ABSTRACT

Batch processing requires sequential, continuous and supervisory control and an effectively control total plant production. Petri net can be applied to event related process control in simulating, checking, debugging, and stating the quantitative deviations from the ideal solutions of any given continuous or discrete process as well as providing formal checking at all development stages from specification, design and implementation. This thesis searches the basic concepts and uses of the classical method Petri net algorithm in SCADA system to control and monitoring the process plant. This thesis has presented a framework for designing and implementing a Petri net based supervisory for online control systems with the human in the loop, that mean human as a operator to switch the operation or monitoring the process flow.

In this thesis, Petri nets are used in designing the supervisory system that yield a compact graphical model for the real-time control system. Our approaches ensure that algorithm and real-time control operations give safety requirements for the system.

This research is made for a system with fully integrated facilities for analyzing, monitoring and controlling of batch plant based on graph theory, batch modelling by means of Petri net algorithm and theory, control and configuration of SCADA system. Among the major benefits expected from the use of the algorithms are increasing the production, reducing cycle times, increasing yields and improved planning. Improved product quality achieved through greater repeatability of processing tasks from batch to batch and reduced the operating cost.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

In this millennium, the increasing numbers of computer users, particularly due to the demands from technical profession and business. The influx of new users includes a great deal of those who have little or no knowledge in programming. Research have been conducted to find ways to bring simple programming languages and useful those who can gain many beneficial from the programming. Various attempts have been made to design new or improved the languages and control system based on the Petri net algorithm [1]. The effective use of visual symbols can also bridge the gap between the user and the computer by providing an environment whereby the user specifies his requirement through interactive graphics. Visual language can be made easy and simple through use of meaningful icons and symbols.

Visualization (graphical method and mathematical approach) communication and controlling the system is highly desirable because it is more natural for people to deal with the image. The symbols also can easily learn and recognized because images process are more universality than text. The uses of visual symbols therefore reduce the mental memory workload of the user especially for process control